

# PATENT ABSTRACTS OF JAPAN

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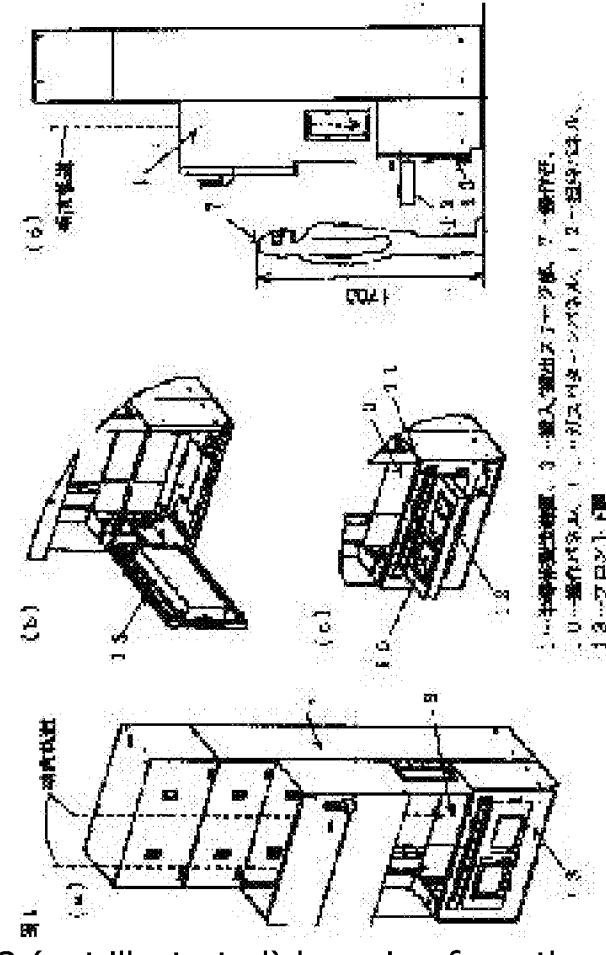
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## (54) MANUFACTURING APPARATUS FOR SEMICONDUCTOR

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a manufacturing apparatus for semiconductors that solves the problem of the installation position of a display operation section for displaying an operation state and operating command action, and accommodates the display operation section in a portion within a standard dimension that is specified by SEMI Standards (Semiconductor Device and Material Institute).

**SOLUTION:** In the manufacturing apparatus for semiconductors 1, a carrier panel 12 for carrying an operation panel 10 and a gas pattern panel 11 is provided on the front wall, namely a front lower door 13 of the apparatus 1 that is placed at a portion that is lower than a vertical track (a dotted line arrow) where an outside-air cut-off substrate cassette 2 (not illustrated) is lowered to a carry-in/carry-out stage section 3 from an upper overhead carrying machine 8 (not illustrated), thus safely operating the apparatus 1 without coming into contact with the outside-air cut-off substrate cassette 2 (not illustrated) lowering from the



upper overhead carrying machine 8 (not illustrated) when an operator 7 operates the apparatus 1.

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## **CLAIMS**

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[Claim(s)]

[Claim 1]In a semiconductor manufacturing device which has carrying-in/taking-out stage part which can lay a substrate cassette which descends from an overhead location conveyer, and a display operating section which performs operation situation display and operation command operation at the device front, A semiconductor manufacturing device, wherein said display operating section is provided in said device front wall projected before said device front wall or said vertical orbit below a vertical orbit of said substrate cassette which descends from said overhead location conveyer.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

[Field of the Invention]This invention relates to a semiconductor manufacturing device.

**[0002]**

[Description of the Prior Art]In the process of manufacturing semiconductor devices, such as IC and LSI, the semiconductor manufacturing device which processes oxidation treatment, chemical-vapor-deposition (CVD) processing, etc. to a semiconductor substrate is used.

[0003]In such a semiconductor manufacturing device, although it is necessary to make a device size small for footprint reduction, In a 300-mm device (device which processes the wafer of the diameter of 300 mm), The access size of the open air interception substrate cassette (FOUP, the abbreviation for Front Open UnifiedPod) was decided, and reservation of installing spaces, such as a maintenance operation part from a transverse plane, poses a problem from it.

[0004]An example of the semiconductor manufacturing device in conventional technology is shown in drawing 5. (a) is a transverse-plane perspective view of the semiconductor manufacturing device 1 among a figure, and (b) is a rear-face perspective view of the device 1.

[0005]In drawing 5, when 3 carries in the open air interception substrate cassette 2 to the device 1 or takes it out from the device 1, it is carrying-in/taking-out stage part which lays the open air interception substrate cassette 2 temporarily.

[0006]In conventional technology, as shown in (a) of drawing 5, the display operating section 6 which performs operation situation display and operation command operation was installed in the pan of the device front opening part 4 with a front shutter of the carrying-in/taking-out stage part 3 upper part at the upside device front wall 5.

**[0007]**

[Problem(s) to be Solved by the Invention]In that case, as shown in drawing 6, if the installed position of the display operating section 6 sees from the device 1 outside, When it becomes the rear of carrying-in/taking-out stage part 3 and the device operation person 7 operates the device 1, Since the substrate cassette 2 may be taken down from the overhead location conveyer (OHT, the abbreviation for Overhead Hoist Transfer) 8 to up to the stage part 3, the

problem that the installed position of the display operating section 6 will turn into a position inconvenient for the device operation person 7 occurs. That is, when the operator 7 operates the device 1, there is a possibility of contacting the open air interception substrate cassette 2 taken down from the overhead location conveyer 8.

[0008]It solves that the purpose of this invention is a position with an inconvenient installed position of the display operating section which performs the problem in the above-mentioned conventional technology, i.e., operation situation display, and operation command operation, And it is in providing the semiconductor manufacturing device which stored the display operating section into the portion within the standard size which a SEMI standard (a semiconductor device and a material association standard) defines.

[0009]

[Means for Solving the Problem]In this invention in order to solve an aforementioned problem, In a semiconductor manufacturing device which has carrying-in/taking-out stage part which can lay the substrate cassette according to claim 1 which descends from an overhead location conveyer like, and a display operating section which performs operation situation display and operation command operation at the device front, Said display operating section constitutes a semiconductor manufacturing device providing in said device front wall projected before said device front wall or said vertical orbit below a vertical orbit of said substrate cassette which descends from said overhead location conveyer.

[0010]

[Embodiment of the Invention]The display operating section which performs operation situation display of a semiconductor manufacturing device and operation command operation to this invention in an embodiment, It is installed in the front wall of carrying-in/taking-out stage part, i.e., the device front wall which it was installed in the device front wall located below the vertical orbit of the substrate cassette which descends from an overhead location conveyer, or was projected before the vertical orbit of said substrate cassette. Here, a vertical orbit means the locus drawn at the time of substrate cassette descent, one point, for example, the center of gravity, in a substrate cassette. Since a display operating section is under from the passage where it sees from the operator of a device and a substrate cassette (it is not necessarily an open air interception type) gets down from an overhead location conveyer to carrying-in/taking-out stage part, or before an operator in such a gestalt, Even if an operator lengthens a hand to a display operating section, the substrate cassette which descends to carrying-in/taking-out stage part is not contacted, and there is no inconvenience.

[0011]One example of an embodiment of the invention is shown in drawing 1. (a) is the whole semiconductor manufacturing device 1 perspective view among a figure, (b) is a perspective view in the state where it opened, the door 13, i.e., the front lower door, of the lower part of device 1 transverse plane, (c) is a perspective view of a display operating section, and (d) is a side view showing the physical relationship of the device 1 and the operator 7.

[0012]If the support panel 12 which supports final controlling element-related the unit 10, i.e., a navigational panel, and the gas pattern panel 11 is formed in the front lower door 13 which is a front wall of carrying-in/taking-out stage part 3 as shown in drawing 1, the installed position will not be a position inconvenient for the operator 7. Namely, the support panel 12 which supports the navigational panel 10 and the gas pattern panel 11, The open air

interception substrate cassette 2 (not shown) from the overhead location conveyer 8 (not shown). Since it is provided, the device 1 front wall 13, i.e., the front lower door, below the vertical orbit (a dotted-line arrow shows to (a) of drawing 1, and (d)) which descends to carrying-in/taking-out stage part 3, As shown in (d) of drawing 1, when the operator 7 operates the device 1, the open air interception substrate cassette 2 (not shown) taken down from the overhead location conveyer 8 (not shown) is not contacted, and it is safe. And it is a size of the device within a SEMI standard, and can install.

[0013]In this case, the front lower door 13 corresponds to the "device front wall below the vertical orbit of the substrate cassette which descends from an overhead location conveyer" according to claim 1, and the navigational panel 10 and the gas pattern panel 11 constitute the "display operating section" according to claim 1.

[0014]In this example of an embodiment, even if it changes to the open air interception substrate cassette 2 and uses the substrate cassette which is not an open air interception type, there is no change in the effect of this invention.

[0015]Supposing height is set to 900 mm or less and fixes the support panel 12 to the front lower door 13 in the front lower door 13, From height being low for operating it and operativity worsening for an operator. As the axis of rotation which has a function equivalent to a hinge while the upper limb and the front lower door 13 of the support panel 12 is established, the support panel 12 is made into flap (Flap) structure and it was shown in (c) of drawing 1, and (d), As it could be made to rotate, operativity has been improved until the field of the support panel 12 became level at least.

[0016]As shown [ that the final controlling element (support panel 12) has been raised and ] in drawing 2, in order to be anxious about interference with the automatically carry robot (AGV) 20 for open air interception substrate cassette 2 conveyance which accesses device 1 front face, A switch (not shown) is installed in the front lower door 13 or the support panel 12, and it is a switching condition (a closed state) of the support panel 12. The state where the field of the support panel 12 is parallel to the field of the front lower door 13, the state where an opened state is other -- carrying out -- it enabling it to detect, and the navigational panel 10 being made into a touch pen system, and by adding the sensor which detects whether the touch pen is inserted also in the holder (not shown) of the touch pen for final controlling elements, In the state where the touch pen is not inserted in the sensor holder, since a possibility that there is the operator 7 before the device 1 and he is operating it is high when it is in the state which the final controlling element panel opened, it has composition which warns.

[0017]The open air interception substrate cassette 2 (shown in drawing 2) conveyed by the automatically carry robot 20 is also acceptable in carrying-in/taking-out stage part 3.

[0018]Drawing 3 is a figure explaining the device which changes a part of transverse plane of the semiconductor manufacturing device 1 shown in drawing 1. (a) of a figure is the whole semiconductor manufacturing device 1 perspective view, and (b) is explanation of the manual operation button sequence 37 fixed to the front lower door 13.

[0019]In (a) of drawing 3, although 30 is a panel which is the front part and which changes, for example by stainless steel, excluding the front lower door 13 of the device 1, and that

construction material is not restricted to stainless steel, in order to avoid confusion with support panel 12 grade, the stainless steel panel [ this panel ] 30 is written. 31 is a terminal area with the hanging mechanism of an overhead location conveyer, and 32 is a signal tower which displays various signals in vertical arrangement, 35 is a load port for carrying in/taking out of the open air interception substrate cassette 2, and 33 is a load port indicator which displays the state of the load port 35, and 34, In carrying in/carrying out path of the open air interception substrate cassette 2, it is a front shutter for intercepting the device 1 and the external world, and the optical beam of the beam sensor (not shown) which detects carrying in/taking out of the open air interception substrate cassette 2 is running along with the front shutter 34. 36 is an infrared signal unit for performing information exchange between automatically carry robots (not shown), and 37 is a manual operation button sequence.

[0020]The support panel 12 can be opened and closed manually, and if it is in fixed time and an opened state in the state of disuse, the buzzer for warning will sound.

[0021]A beam sensor is undetectable at the time of access to the load port 35.

[0022]The load port indicator 33. [ whether the load port 35 carries the open air interception substrate cassette 2 and ] In a loaded state (state where the substrate in the open air interception substrate cassette 2 is contained in the processing chamber of the device 1), or an unload condition (state where the substrate in the open air interception substrate cassette 2 is taken out from the processing chamber of the device 1). A reserve state (state where the substrate in the open air interception substrate cassette 2 is contained in the spare room), and abnormalities have occurred, or \*\* is displayed.

[0023]The signal tower 32 is not made to project from the stainless steel panel 30.

[0024](b) of drawing 3 shows the manual operation button sequence 37 fixed to the front lower door 13. A "stop" of the explanation given to the button among the figure, and a "halt", Mean the stop of machine operation, and a halt and, respectively "loading", Mean putting the substrate in the open air interception substrate cassette 2 into the processing chamber of the device 1, and "unloading", It means taking out a substrate from the processing chamber of the device 1, a "pendant connector" means control of the terminal area 31 with the hanging mechanism of an overhead location conveyer, and a "EMO switch" means an EMO-related switch.

[0025]Drawing 4 shows other examples of the embodiment of the invention. (a) is the whole semiconductor manufacturing device 1 perspective view among a figure, (b) is the whole device 1 perspective view in the state where it was made to slide even to the position in which the operator of the device 1 tended to operate the support panel 12 (parallel translation), and (c) is a side view showing the physical relationship of the device 1 and the operator 7.

[0026]The support panel 12 which supports the navigational panel 10 and the gas pattern panel 11, The open air interception substrate cassette 2 (not shown) rather than the vertical orbit (a dotted-line arrow shows to (c) of drawing 4) taken down from the overhead location conveyer 8 (not shown). Since it is provided in the outside of the device 1, i.e., device 1 front wall projected before the vertical orbit, As shown in (c) of drawing 4, when the operator 7 operates the device 1, the open air interception substrate cassette 2 (not shown) taken down from the overhead location conveyer 8 (not shown) is not contacted, and it is safe.

[0027]In this case, the navigational panel 10 and the gas pattern panel 11 constitute the

"display operating section" according to claim 1, and it this display operating section, It is provided in device 1 front wall projected before the vertical orbit of the open air interception substrate cassette 2 (not shown) which descends from the overhead location conveyer 8 (not shown) so that clearly from the above-mentioned explanation.

[0028]In this example of an embodiment, even if it changes to the open air interception substrate cassette 2 and uses the substrate cassette which is not an open air interception type, there is no change in the effect of this invention.

[0029]The support panel 12 which supports the navigational panel 10 and the gas pattern panel 11 can be slid even to the position which the operator 7 tends to use from the state shown in (a) of drawing 4 as shown in (b) of drawing 4, and (c).

[0030]Since it stops performing operation command operation in the space from which a substrate cassette gets down when it is SEMI standard correspondence and a substrate cassette gets down from an overhead location conveyer, as explained above, it is avoidable from inconvenience. The display operating section is installed in the good position of operativity also to a short person.

[0031]

[Effect of the Invention]By operation of this invention, it solves that it is a position with an inconvenient installed position of the display operating section which performs operation situation display and operation command operation, and, moreover, it becomes possible to provide the semiconductor manufacturing device which stored the display operating section into the portion within the standard size which a SEMI standard (a semiconductor device and a material association standard) defines.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]an embodiment of the invention -- it is a figure showing an example.

[Drawing 2]an embodiment of the invention -- it is a figure explaining the physical relationship of the semiconductor manufacturing device and automatically carry robot in an example.

[Drawing 3]It is a figure explaining the device which changes a part of transverse plane of the semiconductor manufacturing device shown in drawing 1.

[Drawing 4]It is a figure showing other examples of an embodiment of the invention.

[Drawing 5]It is a figure explaining the semiconductor manufacturing device in conventional technology.

[Drawing 6]It is a figure explaining the physical relationship of the semiconductor manufacturing device and operator in conventional technology who showed drawing 5.

[Description of Notations]

1 -- A semiconductor manufacturing device, 2 -- An open air interception substrate cassette, 3 -- Carrying-in/taking-out stage part, 4 [ -- Operator, ] -- A device front opening part, 5 -- A device front wall, 6 -- A display operating section, 7 8 [ -- Support panel, ] -- An overhead location conveyer, 10 -- A navigational panel, 11 -- A gas pattern panel, 12 13 -- A front lower door, 20 -- An automatically carry robot, 30 -- Stainless steel panel, 31 [ -- A front shutter, 35 / -- A load port, 36 / -- An infrared signal unit, 37 / -- Manual operation button sequence. ] -- A terminal area with the hanging mechanism of an overhead location conveyer, 32 -- A signal tower, 33 -- A load port indicator, 34

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**DRAWINGS****[Drawing 1]**

図1

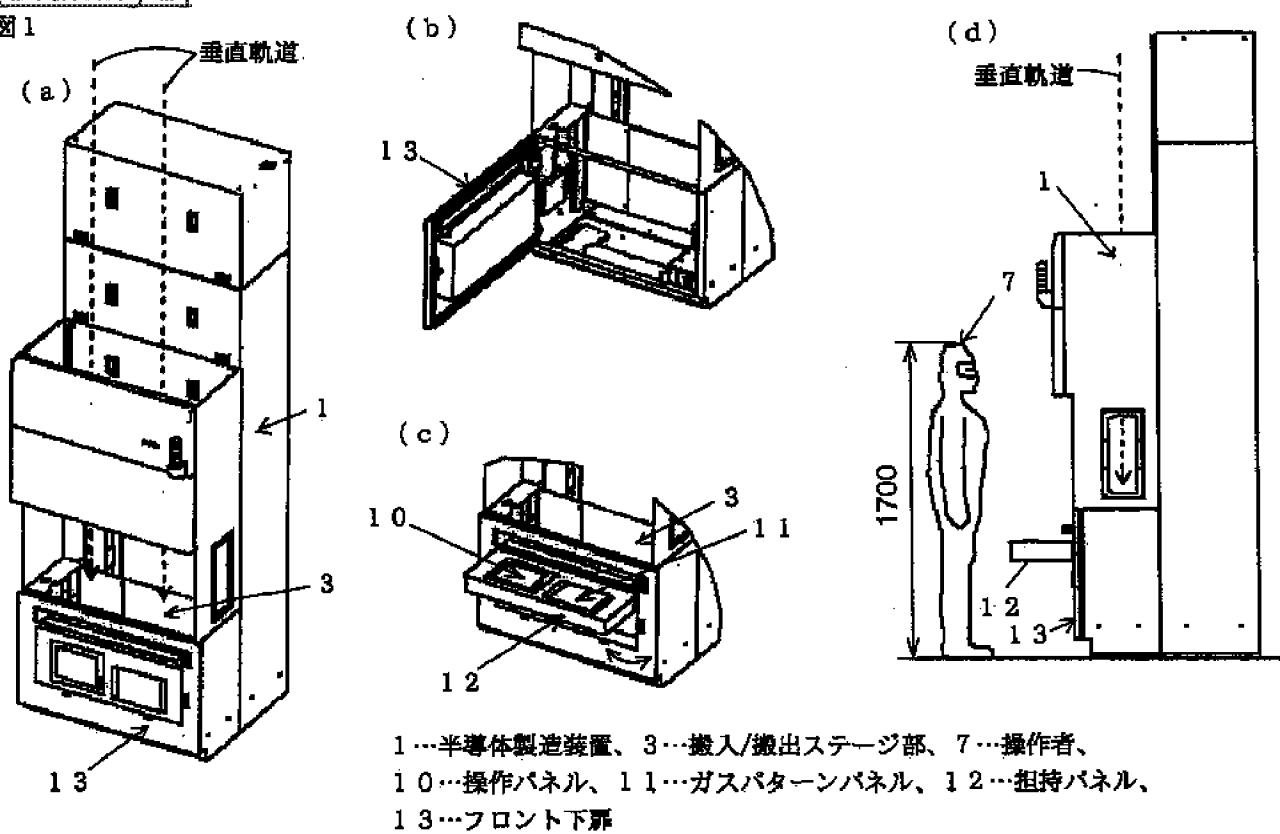
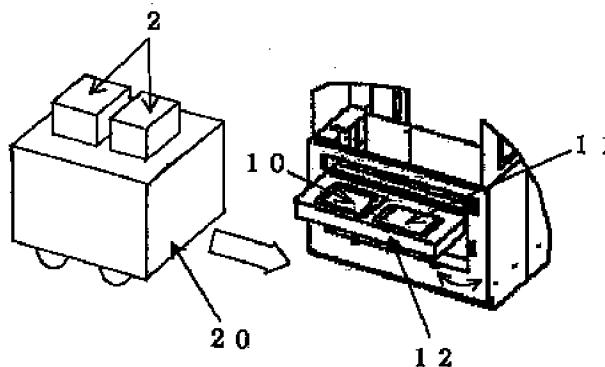
**[Drawing 2]**

図2

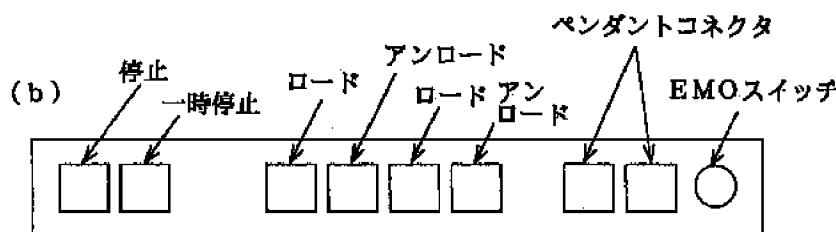
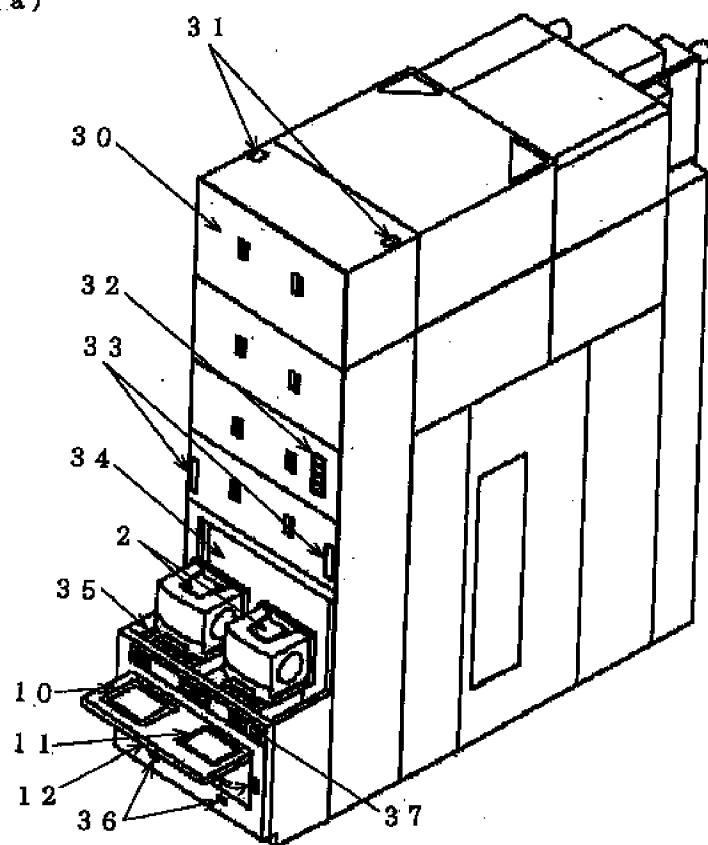


2…外気遮断基板カセット、20…自動搬送ロボット

### [Drawing 3]

図3

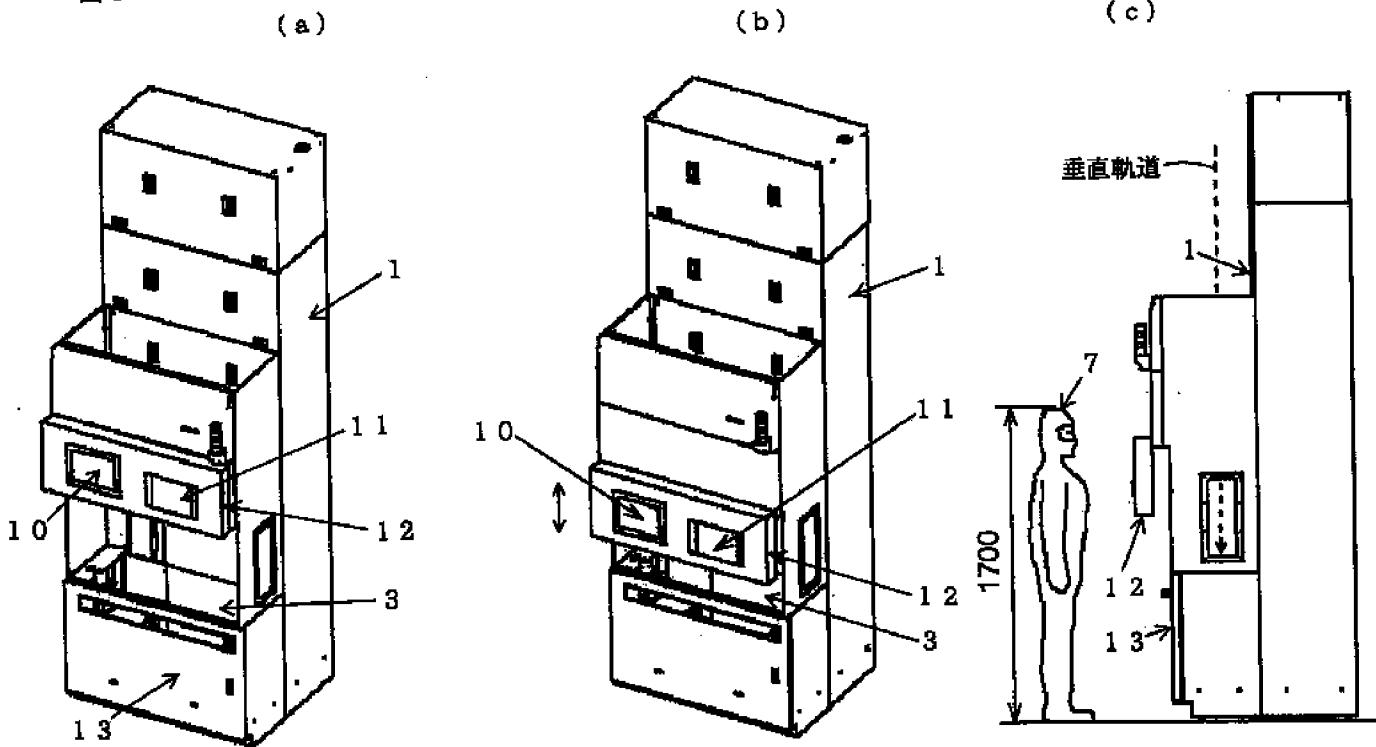
(a)



30…ステンレスパネル、31…頭上搬送機の釣り下げる機構との接続部、  
32…シグナルタワー、33…ロードポートインディケータ、  
34…前面シャッタ、35…ロードポート、  
36…赤外線信号ユニット、37…操作ボタン列

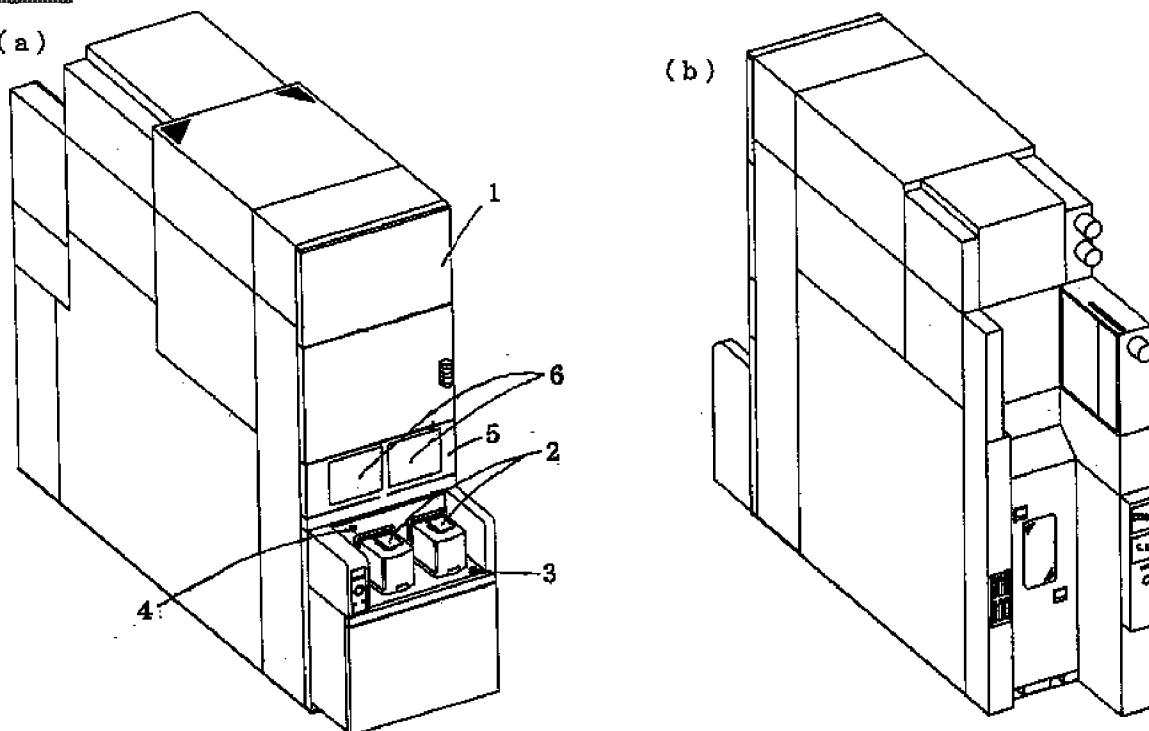
[Drawing 4]

図4



[Drawing 5]

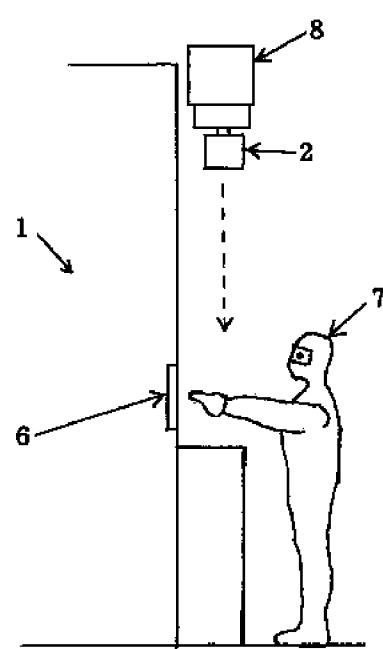
図5



1…半導体製造装置、2…外気遮断基板カセット、  
3…搬入/搬出ステージ部、4…装置正面開口部、5…装置正面壁、  
6…表示操作部

[Drawing 6]

図6



7…操作者、8…頭上搬送機

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